

AMENDMENTS IN THE CLAIMS

Please amend claim 25 and newly add claims 37-44 by this amendment as follows:

1 1. (Previously Presented) A bubble-jet type ink jet printhead, comprising:
2 a substrate having a manifold and an ink chamber formed therein, said manifold and said ink
3 chamber being connected to each other and both being formed as recesses in a top surface of the
4 substrate;
5 a nozzle plate located on said top surface of said substrate to cover the manifold and the ink
6 chamber, said nozzle plate being perforated by a nozzle hole located directly above a center portion
7 of said ink chamber;
8 a heater being disposed on the nozzle plate and being disposed around the nozzle hole on the
9 nozzle plate; and
10 electrodes electrically connected to the heater, said ink chamber forming a substantially
11 concave surface in said substrate.

1 2.(Previously Presented) The printhead of claim 1, wherein said ink chamber being
2 essentially hemispherical in shape.

1 3.(Previously Presented) The printhead of claim 2, further comprising an ink channel
2 disposed in said top surface of said substrate between said manifold and said ink chamber, said ink
3 channel being integral with and connecting said manifold with said ink chamber.

1 4.(Previously Presented) The printhead of claim 3, said ink chamber being formed deeper
2 in said top surface of said substrate than said ink channel.

1 5. (Previously Presented) The printhead of claim 3, wherein a lip is formed in said substrate
2 between said ink chamber and said manifold.

1 6.(Previously Presented) The printhead of claim 1, the ink chamber having an elliptic cross
2 section, and one side of the semimajor axis of said ink chamber is directly joined to said manifold.

1 7.(Original) The printhead of claim 6, wherein said heater is elliptic in shape, conforming
2 to the shape of the ink chamber having a elliptic cross section.

1 8.(Previously Presented) The printhead of claim 1, wherein the nozzle plate comprises:
2 an insulating layer covering said substrate, wherein an opening for an ink chamber and an
3 opening for said manifold are formed at positions corresponding to the center portion of the ink
4 chamber and said manifold, respectively; and
5 a protective layer covering said insulating layer and covering said opening for said manifold,
6 said protective layer having an opening above said ink chamber serving as said nozzle hole for said
7 printhead.

1 9. (Original) The printhead of claim 8, wherein said protective layer is comprised of a
2 polyimide film.

1 10.(Previously Presented) The printhead of claim 1, further comprising a bubble guide and
2 a droplet guide, said droplet guide being an extension of said nozzle hole with walls extending
3 towards a bottom surface of said ink chamber, said bubble guide being a gap in said substrate near
4 said heater and exterior to said droplet guide, said bubble guide providing a space for a bubble to
5 grow inside said ink chamber.

1 11.(Original) The printhead of claim 1, wherein the heater is “C” shaped and the electrodes
2 are coupled to both ends of the “C” shaped heater, respectively.

1 12.(Original) The printhead of claim 2, wherein the heater is “O” shaped and the electrodes
2 are electrically coupled to two diametrically opposite points of said “O” shaped heater, respectively.

13-22. (Canceled)

1 23. (Previously Presented) The printhead of claim 1, said ink chamber and said manifold not
2 perforating said substrate.

1 24. (Previously Presented) The printhead of claim 1, said substrate being absent any

2 perforations through said substrate.

1 25. (Currently Amended) An ink jet printhead, comprising:

2 an ink supply path formed in one surface of said substrate, said ink supply path being
3 connected to a plurality of ink chambers formed in said one surface of said substrate;

4 a nozzle plate disposed on said one surface of said substrate, said nozzle plate being
5 perforated by a plurality of nozzle holes, each nozzle hole corresponding to a corresponding one of
6 said plurality of ink chambers; and

7 a plurality of heater resistors, each one of said plurality of heater resistors corresponding to
8 corresponding ones of said plurality of ink chambers, each heater resistor formed on said nozzle
9 plate, each heater ~~resister~~ resistor disposed above a corresponding ink chamber.

1 26. (Previously Presented) The printhead of claim 25, said ink supply path comprising a
2 manifold extending along a length of said one surface of said substrate, said manifold being
3 connected to a plurality of ink channels formed in said one surface in said substrate, each of said
4 plurality of ink channels being connected to a corresponding one of said plurality of ink chambers,
5 wherein neither of said plurality of ink chambers, said plurality of ink channels and said manifold
6 perforates said substrate.

1 27. (Previously Presented) The printhead of claim 25, said substrate having ink feed grooves
2 at edges of said substrate to supply ink to said ink supply path.

1. 28. (Previously Presented) The printhead of claim 25, further comprising a plurality of
2 tubing segments formed on a side of said nozzle plate facing said substrate, each of said plurality of
3 tubing segments corresponding to corresponding ones of said plurality of nozzle holes, said tubing
4 segments serving to extend said corresponding nozzle holes from said side of said nozzle plate facing
5 said substrate towards a bottom of corresponding ink chambers formed in said one surface of said
6 substrate.

1 29. (Previously Presented) The printhead of claim 25, each of said plurality of ink chambers
2 having an essentially bowl-shape.

1 30. (Previously Presented) The printhead of claim 29, said bowl shape being essentially an
2 outer portion of a hemisphere in shape.

1 31 (Previously Presented) An ink jet printhead, comprising:
2 an ink supply path formed in one surface of said substrate connected to a plurality of ink
3 chambers formed in said one surface of said substrate;
4 a nozzle plate having a top side and a bottom side, said bottom side of said nozzle plate
5 facing said one surface of said substrate, said nozzle plate being perforated by a plurality of nozzle
6 holes, each nozzle hole corresponding to a corresponding one of said plurality of ink chambers;
7 a plurality of heater resistors, each one of said plurality of heater resistors corresponding to

8 corresponding ones of said plurality of ink chambers; and

9 a plurality of nozzle hole extensions protruding from said bottom side of said nozzle plate
10 to bottoms of corresponding ones of said plurality of ink chambers.

1 32. (Previously Presented) The ink jet printhead of claim 31, each nozzle hole having an
2 essentially circular cross section, each nozzle hole extension having a shape of a hollow, cylindrical
3 tube having an inner cross section that is similar to said circular cross section of each nozzle hole.

1 33. (Previously Presented) The ink jet printhead of claim 31, each ink chamber having an
2 essentially hemispherical cross section.

1 34. (Previously Presented) The printhead of claim 31, each ink chamber having an
2 essentially crescent shape.

1 35. (Previously Presented) The printhead of claim 32, each ink chamber having an
2 essentially crescent shape.

1 36. (Previously Presented) The printhead of claim 32, each ink chamber having an
2 essentially crescent shape that conforms to a shape of a bubble being formed from a circular-shaped
3 heater, each nozzle hole extension ending near a middle portion of each crescent-shaped ink
4 chamber.

1. 37. (New) The printhead of claim 1, the ink chamber and the manifold both being adjacent
2 to the top surface of the substrate.

1 38. (New) The printhead of claim 1, both the ink chamber and the manifold being bounded
2 on one side by the top surface of the substrate.

1 39. (New) The printhead of claim 1, each of said manifold and said ink chamber being
2 exposed by said top surface of said substrate.

1 40. (New) The printhead of claim 25, the ink chambers and the ink supply path both being
2 adjacent to the one surface of the substrate.

1 41. (New) The printhead of claim 25, both the ink chambers and the ink supply path being
2 bounded on one side by the one surface of the substrate.

1 42. (New) The printhead of claim 25, each of said ink supply path and said ink chambers
2 being exposed by said one surface of said substrate.

1 43. (New) The printhead of claim 3, each of the ink chamber, the ink channel and the
2 manifold being bounded on one side by the top surface of the substrate.

1. 44. (New) The printhead of claim 26, each of the ink chambers, the ink channels and the
2 manifold being exposed by said one surface of the substrate.